

Charny et al. (hereinafter "Charny") in view of Cloonan et al. (hereinafter "Cloonan") and Momirov. In response, Applicants respectfully traverse the rejections of these claims.

With this amendment, claims 1-33 are pending. No claims have been cancelled, amended or added.

Preliminary Issues:

In the Action, the patent number cited on page 8 for Momirov is U.S. Patent 6,489,209. Patent number 6,489,209 is not a Momirov patent. U.S. Patent, 6,484,209, is a Momirov patent and is consistent with the Action's references to various sections of the Momirov specification. Therefore, 6,484,209 will be the patent referenced in these remarks. However, Applicants are not able to fully address obviousness rejections related to Momirov until receiving clarification on the correct patent number.

Rejection of Claims 1-11 and 23-33:

In paragraph 3 of the Action, claims 1-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charny in view of Cloonan. In addition, in paragraph 4 and 5 of the Action, claims 9, 10, and 23-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charny in view of Cloonan and further in view of Momirov. The rejection of claims 1-11 and 23-33 on the above stated grounds is respectfully traversed.

Claim 1, as previously amended, states:

A switching fabric for transmitting data frames to destinations, each data frame having a destination, the switching fabric comprising:

a plurality of input ports for partitioning portions of received data frames to provide data cells; and

a plurality of crossbar sections, each of the crossbar sections being coupled to each of the input ports for receiving the data cells at cell transfer intervals on a data link coupled between each of the input ports and each of the crossbar sections, each of the crossbar sections being coupled to transmit the data cells to any one of a plurality of output ports,

wherein each of the input ports includes logic for scheduling the transmission of each data cell of each said data frame received at each of the input ports during a cell transfer interval for each data link coupled between each of the input ports and each of the crossbar sections based upon an ability of each of the crossbar sections to receive the data cells of the data frames with a destination associated with the output port.

The Action provides that “Charny discloses a switching fabric for transmitting data frames...wherein each of the input ports includes logic for scheduling the transmission of each data frame received at each of the input ports during a cell transfer interval...based upon an (ability) availability of the path through the crossbar switch to receive the data cells of the data frames with a destination associated with each of the output ports...” Further the Action provides that “Cloonan discloses a system that has multiple crossbar sections called pipes. The inputs to the pipes connect each of the input interfaces with each of the output ports. The switch has a controller that finds an available pipe through the switch fabric to the appropriate output port.” Therefore, the Action provides that “it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with a switch fabric that is divided into different crossbar sections.” Applicants respectfully disagree.

An element of claim 1 is “each of the input ports includes logic for scheduling the transmission of each data cell...based upon an ability of each of the crossbar sections to receive the data cells...”

The Charny reference is directed to a method or an arbitration scheme for providing bandwidth and delay guarantees in a crossbar switch with speedup. The underlying architecture of the input-buffered crossbar switch is a crossbar switch unit (24) coupled to input channels (12) having one or more input ports and output channels having one or more output ports. Each input channel (12) maintains logic in the form of a single flow-level scheduler (28), and a rate scheduler (30). This logic provides schedule information to an arbiter (24) in crossbar unit (24). (Col. 5, line 40 – col. 7, line 65).

Charny does not disclose or suggest logic at the input channel that schedules transmission based upon an ability of each crossbar section to receive data cells as described in claim 1. Rather, Charny discloses the scheduling of a single-flow of a data cell at the input channel. Thus, Charny fails to disclose or suggest a logic that considers the ability of crossbar sections to receive data cells when scheduling the transmissions of the data cells. Accordingly, Applicants respectfully submit that Charny fails to disclose or suggest logic at the input port for scheduling the transmission of data cells as described in claim 1.

The Cloonan reference is cited in the Action to address the acknowledged lack of an expressly disclosed crossbar switch with multiple crossbar sections (Action, page 3). Without regard to multiple crossbar sections and without regard to a motivation to combine Charny and Cloonan, for the reasons stated below, Applicants respectfully submit the Cloonan reference does not cure the deficiencies of the Charny reference stated above.

As mentioned previously, claim 1 describes an input port which includes “logic for scheduling the transmission of each data cell...” Applicants respectfully submit that Cloonan fails to disclose or suggest logic at the input port for scheduling the transmission of data cells as described in claim 1. Rather, Cloonan discloses logic in the switch fabric coupled to the pipes in

the switch fabric to control routing of content from the input ports (Figs 3-5). That is, Cloonan does not disclose or suggest separate logic associated with each of the input ports as provided in claim 1.

Indeed, Cloonan fails to disclose or suggest the selective scheduling of input content to the individual pipes at all. Rather, all content from each input port is non-selectively routed to each pipe, where centralized control logic in the switch controls the pipes to determine which pipe forwards individual content (Fig. 5 and col. 10, lines 35-45).

For at least the foregoing reasons, it is respectfully requested that the Examiner withdraw rejection of claim 1.

Independent claim 23 also includes similar elements to claim 1. In particular, claim 23 contains the element “each of the input ports includes logic for scheduling the transmission of each data cell. . . based upon an ability of each of the crossbar sections to receive the data cells of the data frames with a destination associated with each of the output ports.” Accordingly, claim 23 is patentable over the cited references for reasons analogous to those presented for claim 1.

Additionally, in relation to the Action’s reference to Momirov for rejection of claim 23, Applicants respectfully submit that Momirov was not cited to cure, and does not in fact cure, the deficiencies in Charny and Cloonan stated above. Therefore, for at least the foregoing reasons, it is respectfully requested that the Examiner withdraw rejection of claim 23.

Applicants note that claims 2-11 and 24-33 depend from patentable base claims 1 and 23 respectively. As a result, in addition to any independent bases for patentability, Applicants respectfully submit that claims 2-11 and 24-33 are patentable over the cited references by virtue of at least this dependence. Thus, Applicants respectfully requests that the 35 U.S.C. 103(a) rejections of 2-11 and 24-33 be withdrawn.

Rejection of Claims 12-22:

In paragraph 3 of the Action, claims 11-19, 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Charny in view of Cloonan. In addition, in paragraph 4 of the Action, claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Charny in view of Cloonan and further in view of Momirov. The rejection of claims 12-22 on the above stated grounds is respectfully traversed.

Claim 12, as previously amended, states:

A method of transmitting digital data from a plurality of sources to a plurality of destinations, the method comprising:
receiving data frames at each of a plurality of crossbar sections at cell transfer intervals on a data link coupled between each of the crossbar sections and each of the input ports; and
transmitting the data cells from each of the crossbar sections to any one of a plurality of output ports; and
scheduling the transmission of each data cell of each data frame received at each of the input ports during a cell transfer interval for each data link coupled between each of the input ports and each of the crossbar sections based upon an ability of each of the crossbar sections to receive data cells of data frames with a destination associated with each of the output ports.

The Action provides that “Charny discloses a switching fabric for transmitting data frames...wherein each of the input ports includes logic for scheduling the transmission of each data frame received at each of the input ports during a cell transfer interval...based upon an (ability) availability of the path through the crossbar switch to receive the data cells of the data frames with a destination associated with each of the output ports...” Further the Action provides that “Cloonan discloses a system that has multiple crossbar sections called pipes. The inputs to the pipes connect each of the input interfaces with each of the output ports. The switch has a controller that finds an available pipe through the switch fabric to the appropriate output

port.” Therefore, the Action provides that “it would have been obvious to one of ordinary skill in the art to combine the system of Charny, with a switch fabric that is divided into different crossbar sections.” Applicants respectfully disagree.

An element of claim 12 is “scheduling the transmission of each data cell...based upon an ability of each of the crossbar sections to receive the data cells...”

Charny discloses the scheduling of a single-flow of a data cell based on providing bandwidth and delay guarantees through a crossbar switch. (Col. 5, line 40 – col. 7, line 65). Applicants respectfully submit that Charny does not disclose scheduling based upon an ability of each crossbar section to receive data cells as described in claim 12. Accordingly, Applicants respectfully submit that Charny fails to disclose or suggest scheduling the transmission of data cells based upon an ability of each crossbar section to receive data cells as described in claim 12.

The Cloonan reference is cited in the Action to address the acknowledged lack of an expressly disclosed crossbar switch with multiple crossbar sections (Action, page 3). Without regard to the multiple crossbar sections and without regard to a motivation to combine Charny and Cloonan, for the reasons stated below, Applicants respectfully submit the Cloonan reference does not cure the deficiencies of the Charny reference stated above.

Applicants respectfully submit that Cloonan fails to disclose or suggest selectively scheduling the transmission of each data cell received at each of the input ports based upon the ability of each of the crossbar sections to receive data cells. Rather, Cloonan discloses that all content from each of the input ports is non-selectively routed to each pipe, where centralized control logic in the switch fabric controls the pipes to determine which pipe forwards individual content (Fig. 5 and col. 10, lines 35-45).

Insofar as neither Charny nor Cloonan disclose or suggest scheduling the transmission of each data cell based upon an ability of each of the crossbar sections to receive the data, Applicants respectfully submit that Charny and Cloonan fail to disclose or suggest all the elements of claim 12. Therefore, for at least the foregoing reasons, it is respectfully requested that the Examiner withdraw rejection of claim 12.

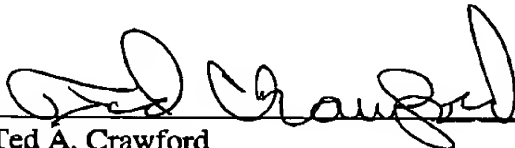
Applicants note that claims 13-22 depend from patentable base claims 12. As a result, in addition to any independent bases for patentability, Applicants respectfully submit that claims 13-22 are patentable over the cited references by virtue of at least this dependence. Thus, Applicants respectfully requests that the 35 U.S.C. 103(a) rejections of 13-22 be withdrawn.

Conclusion

For at least the foregoing reasons, Applicants respectfully submit that claims 1-33, are in condition for allowance and such action is earnestly solicited. *The Examiner is respectfully requested to contact the undersigned by telephone if it is believed that such contact would further the examination of the present application.*

Respectfully submitted,
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Date: 2-23-04

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